

# NASA SBIR/STTR Technologies

H8.03-9492 - Turbo-Brayton Power Converter for Spaceflight Applications



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## Identification and Significance of Innovation

Future NASA space missions require advanced thermal-to-electric power converters that are reliable, efficient, and lightweight. Creare proposes to develop a turbo-Brayton converter with high efficiency and specific power for these applications. Gas bearings will provide reliable, maintenance-free, long-life operation. Discrete components can be packaged to fit optimally with other subsystems. Continuous gas flow can communicate directly with remote heat sources and heat rejection surfaces without ancillary heat transfer components and intermediate flow loops. Creare is well suited to succeed because we have a long history developing Brayton systems for challenging spaceflight applications.

Estimated TRL at beginning and end of contract: ( Begin: 3 End: 4 )

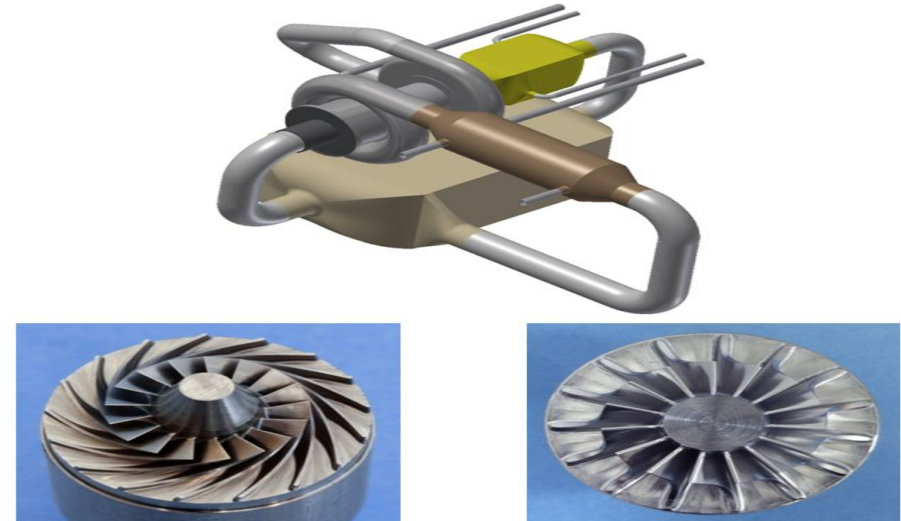
## Technical Objectives and Work Plan

### Technical Objectives

1. Fabricate and test breadboard converter assembly
2. Demonstrate benefits for spaceflight applications
3. Mature approach and enhance readiness level for future programs

### Work Plan

1. Develop detailed component designs
2. Design breadboard converter assembly
3. Fabricate turbomachine
4. Fabricate heat exchangers
5. Assemble converter
6. Measure converter performance characteristics



## NASA Applications

Power systems for space exploration probes, surface rovers, space stations, planetary outposts, and nuclear electric propulsion. Heat sources include radioisotope decay, fission reactors, and concentrated solar radiation.

## Non-NASA Applications

Power systems for unmanned aerial vehicles, unmanned undersea vehicles, and mobile electric generators. Particularly attractive for mobile applications, environments with significant particulate contamination, and environments exposed to corrosive substances such as sea water. Heat sources include fossil fuel combustion, biofuel combustion, refuse burning, and concentrated solar energy.

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**NON-PROPRIETARY DATA**